PROCEEDINGS

53. IWK

Internationales Wissenschaftliches Kolloquium
International Scientific Colloquium

Faculty of
Mechanical Engineering

PROSPECTS IN MECHANICAL ENGINEERING

8 - 12 September 2008

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http://www.db-thueringen.de/servlets/DocumentServlet?id=17534

Published by
Impressum

Publisher Herausgeber	Der Rektor der Technischen Universität Ilmenau Univ.-Prof. Dr. rer. nat. habil. Dr. h. c. Prof. h. c. Peter Scharff
Editor Redaktion	Referat Marketing und Studentische Angelegenheiten Andrea Schneider Fakultät für Maschinenbau Univ.-Prof. Dr.-Ing. habil. Peter Kurz, Univ.-Prof. Dr.-Ing. habil. Rainer Grünwald, Univ.-Prof. Dr.-Ing. habil. Prof. h. c. Dr. h. c. mult. Gerd Jäger, Dr.-Ing Beate Schlütter, Dipl.-Ing. Silke Stauche
Editorial Deadline Redaktionsschluss	17. August 2008
Publishing House Verlag	Verlag ISLE, Betriebsstätte des ISLE e.V. Werner-von-Siemens-Str. 16, 98693 Ilmenau

CD-ROM-Version:

Implementation Realisierung	Technische Universität Ilmenau Christian Weigel, Helge Drumm
Production Herstellung	CDA Datenträger Albrechts GmbH, 98529 Suhl/Albrechts

ISBN: 978-3-938843-40-6 (CD-ROM-Version)

Online-Version:

Implementation Realisierung	Universitätsbibliothek Ilmenau ilmedia Postfach 10 05 65 98684 Ilmenau

Home / Index:
http://www.db-thueringen.de/servlets/DocumentServlet?id=17534

53rd Internationales Wissenschaftliches Kolloquium
Technische Universität Ilmenau
08 – 12 September 2008

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The Application of Design Process Patterns exemplified by the C&CM Sequence Model

Knowledge management gains increasingly influence in development departments. Design knowlegde is stored as prose text or formalized in design rules, guidelines, catalogues or design patterns. An essential element of knowlegde management is the knowledge representation. This contribution presents design patterns as a means of support for representing design process knowledge at the example of the Contact and Channel (C&CM) Model.

The use of the Contact and Channel Model [1] for challenging design problems has proven value to its applicants. The model combines function and embodiment of technical systems. For analyzing functional sequences temporal decomposition functional states is conducted and then modeled by Working Surface Pairs and Channel and Support Structures.

Design Patterns were developed by Alexander [2]. These patterns realized to tear down architecture into elementary patterns and relationships of those. The other way round, architecture could be found on a set of established sucessful elements, i.e. design patterns. According to Alexander a pattern has a defined format consisting of pattern name, validity, an illustration of an application example, the relevant context, a problem description, well-proven solutions and the relations to other patterns.

Beside architecture, design patterns became very popular in other fields, e.g. in software engineering (cp. [3]). However, in mechanical engineering as well as in other traditional engineering domains design patterns are not yet an established means of support [4,5].

Design patterns basically consist of three relevant formal elements: problem, well-proven solutions and consequences of the pattern application. The patterns are only valid within a given context.

Design patterns cannot only be applied for describing expert knowledge of design solutions but also for design process knowledge, that proved to be sucessful in the past. For supporting design engineering activity by design patterns and design process patterns a test environment based on an open content management system – a wiki system - is proposed (cp. Fig. 1). This web-based representation allows easy sharing

and representation of knowledge by means of patterns and supports modeling activities such as those exemplified by the C&CM sequence model (cp. [6,7]).

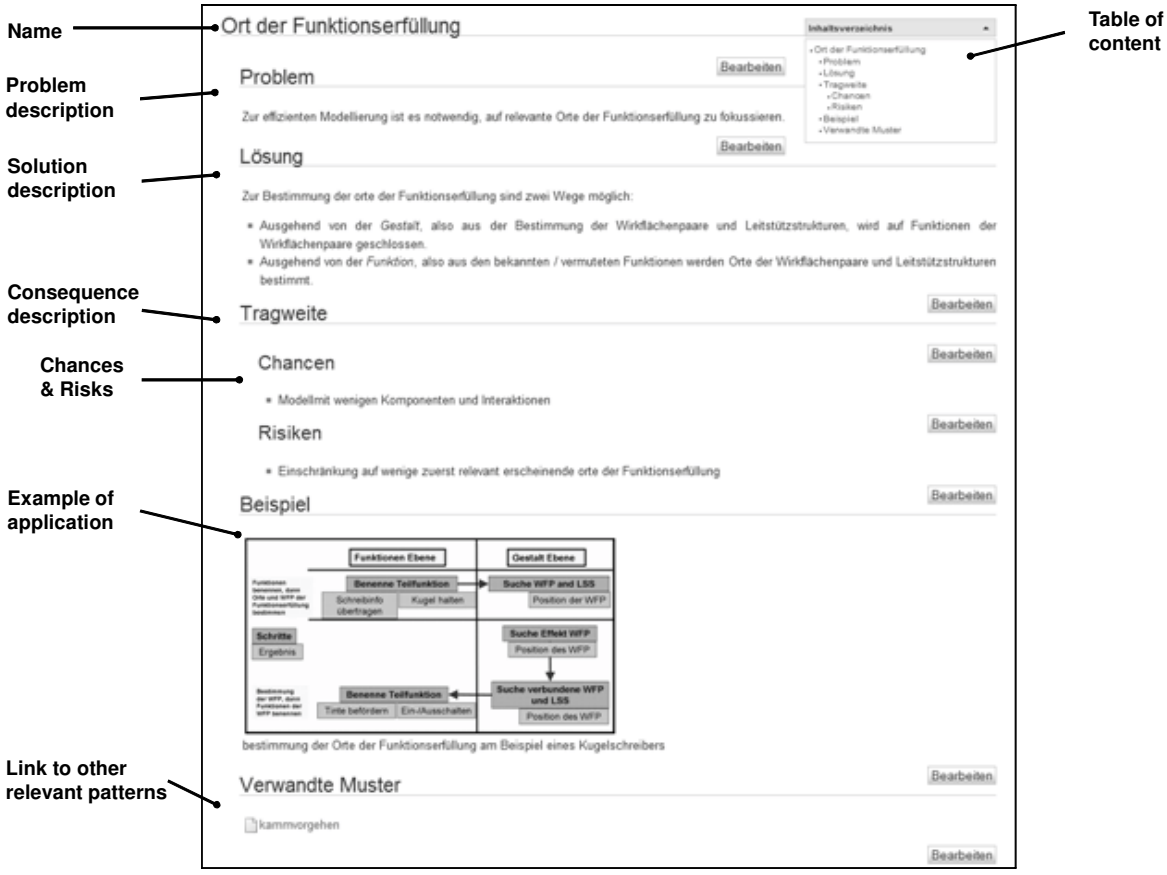

Fig. 1: C&CM pattern represented by a wiki system

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